

## **EXHIBIT F**

90720977  
06/07/00

	Subclass:
	Class
ISSUE CLASSIFICATION	



**PROVISIONAL  
APPLICATION  
NUMBER**

Form PTO-1625  
(Rev. 6/99)

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PATENT APPLICATION SERIAL NO. \_\_\_\_\_

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE  
FEE RECORD SHEET

06/09/2000 EHAMDND 00000063 60209771

01 FC:214 75.00 OP

PTO-1556  
(5/87)

\*U.S. GPO: 1999-459-082/19144



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Bib Data Sheet

SERIAL NUMBER 60/209,771	FILING DATE 06/07/2000 RULE -	CLASS -	GROUP ART UNIT -	ATTORNEY DOCKET NO. 1179
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**APPLICANTS**

Ilan Ben-David, Rosh Ha'ayin, ISRAEL;

**\*\* CONTINUING DATA \*\*\*\*\*****\*\* FOREIGN APPLICATIONS \*\*\*\*\***

**IF REQUIRED, FOREIGN FILING LICENSE  
GRANTED \*\* 08/29/2000**

**\*\* SMALL ENTITY \*\***

Foreign Priority claimed <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	STATE OR COUNTRY ISRAEL	SHEETS DRAWING 1	TOTAL CLAIMS -	INDEPENDENT CLAIMS -
35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input type="checkbox"/> Met after Allowance				
Verified and Acknowledged Examiner's Signature _____ Initials _____				

**ADDRESS**

AIR MAIL

Edward Langer  
 POB 410  
 Giron Center 312  
 Raanana ,  
 ICELAND

**TITLE**

High gamut video display

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**DWARD LANGER, B.S.E.E., M.B.A., J.D.**  
**ADVOCATE & PATENT ATTORNEY**

312 GIRON CENTER, P.O.B. 410 RAANANA 43103 ISRAEL  
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Date: 5 June 2000

JCS 35 U.S. PTO  
00/00/90

JCS 41 U.S. PTO  
60/209771  
06/07/00

The Commissioner of Patents and Trademarks  
 Box Patent Application  
 Washington, D. C. 20231  
 U.S.A.

Sir:

Enclosed herewith for filing is the following utility patent application: (PROVISIONAL)

Applicant: BEN-DAVID, Ilan

Title of Application: A HIGH GAMUT VIDEO DISPLAY

Pages of specification: 3 (+ 1 pp. of claims XXXXXXXXabetcXXXX)

Sheets of drawing: 1

Executed on: 5 June 2000 Docket No.: 1179

TOTAL FILING FEE \$75.00

A check in the amount of the total filing fee is enclosed herewith.

Also enclosed herewith for filing in connection with the enclosed are:

Oath:

Declaration XXX Provisional Cover Sheet

Disclosure Statement:

Letter referencing previously filed disclosure document; number \_\_\_\_\_ filed \_\_\_\_\_;

Verified Statement claiming small entity status;

An assignment of the application to: \_\_\_\_\_;

Claim(s) to priority

A certified copy of a \_\_\_\_\_ patent application or inventor's certificate, filed \_\_\_\_\_ and serial no. \_\_\_\_\_, upon which a claim to priority is made;

Other: \_\_\_\_\_

Respectfully submitted,

  
 Edward Langer, Attorney  
 Reg. No. 30,564

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## **PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

INVENTOR(S)					
Given Name (first and middle (if any))	Family Name or Surname	Residence (City and either State or Foreign Country)			
Ilan	BEN-DAVID	Rosh Ha'ayin, Israel			
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
<b>TITLE OF THE INVENTION (280 characters max)</b>					
A HIGH GAMUT VIDEO DISPLAY					
<i>Direct all correspondence to:</i> <b>CORRESPONDENCE ADDRESS</b>					
<input type="checkbox"/> Customer Number <input type="text"/>		  <input type="checkbox"/> Place Customer Number Bar Code Label here			
<i>OR</i> <input type="checkbox"/> Firm or <input checked="" type="checkbox"/> Individual Name <input type="text" value="Edward Langer"/>					
Address	<input type="text" value="POB 410"/>				
Address	<input type="text" value="Giron Center 312"/>				
City	<input type="text" value="Raanana"/>	State		ZIP	
Country	<input type="text" value="Israel"/>	Telephone	<input type="text" value="972-9-7713585"/>	Fax	<input type="text" value="972-9-7713593"/>
<b>ENCLOSED APPLICATION PARTS (check all that apply)</b>					
<input checked="" type="checkbox"/> Specification Number of Pages <input type="text" value="3"/>	<input checked="" type="checkbox"/> Small Entity Statement				
<input checked="" type="checkbox"/> Drawing(s) Number of Sheets <input type="text" value="1"/>	<input type="checkbox"/> Other (specify) <input type="text"/>				
<b>METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)</b>					
<input checked="" type="checkbox"/> A check or money order is enclosed to cover the filing fees					<b>FILING FEE AMOUNT (\$)</b> <input type="text" value="\$75.00"/>
<input type="checkbox"/> The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: <input type="text"/>					<input type="text" value="75.00"/>
<p>The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.  <input checked="" type="checkbox"/> No.  <input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____</p>					

Respectfully submitted,

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TYPED or PRINTED NAME TELEPHONE Date REGISTRATION NO. 

(If appropriate)

Docket Number: 

## **USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C., 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C., 20231.

Date : 19-05-2000

**Title: A High Gamut Video Display**

Inventor: Ilan Ben-David, 55 Paamon st. , Rosh Haayin , ISRAEL 40800

Reference : Gary G. Field , Color and its Reproduction ,GATFPress ,1999

**Background:**

Video displays are used to display digital data, the digital file is represented in a form of image data to be displayed. Today's video display systems are using additive color system based on the addition of 3 the primary colors red , green and blue . By mixing different proportion of the primary colors the different colors are created. The volume in color space that a device can display is called color gamut of the device.

While electronic display devices are based on different technologies (CRT's, LED, LCD projectors and more) they all use the same principals of the additive RGB color system. Due to limitations in the primary colors spectral response, existing display devices can not show the full range of colors the human eye can see. Colors that can not be reproduced on the display device are called out of Gamut colors.

Another problem of the electronic display devices is that they are based on emitting radiation from the display to the viewer's eye. In contrast, most natural objects are reflective and their color appearance is highly dependent on the lighting environment i.e. light source properties.

This means that color match could be achieved between an object and color display only under strictly controlled viewing conditions (impossible constraint in most cases). One way to over come this is to have a correction mechanism to compensate for different light sources. This solution although possible is based on using different mathematical color transformation on the image data for each lighting condition, again a very unfeasible solution in the real world, where lighting condition change from room to room and in different position in the same room.

**The solution**

A new display device based on the following principals:

1. Passing white light through color filters creates the primary colors. The white light can be controlled independently both in intensity and spectrum.
2. The number of filters used to create the primary color is more then 3. (In the preferred embodiment, 7 filters are used ( red , green , blue , cyan magenta and white ) .
3. Spatial light modulator technology (such as LCD (liquid crystal display) or DMD (deformable mirror device) ) is used to create the image. Each color

frame is composed from monochrome frames as the number of colors. For example in a 7 primary color display, 7 monochrome frame are generated.

4. The RGB or CMYK image file is transformed into a right number of color components .For example, In case of 7 color display the transformation is based on Neugebauer equations (see reference page 407). On the general case a M to N look up table transformation is used where M is the number of primary color in the image file and N is the number of primary colors in the display.

The suggested solution has the following advantages:

1. Large color gamut compared to conventional RGB displays.
2. Using color filters allows freedom in selecting primary colors. This allows selecting color filters that can accurately simulate painting and printing process by using the same spectral characteristics as the primary color used in the "real" world specific process.
3. By controlling the white light source both in intensity and spectrum, compensation for different lighting conditions is done easily. This compensation is done on the device itself and not on the image file and it follows the physical process that exists in nature.

### **Implementation**

The system is composed from two major parts:

1. Color transformation module.
2. Display module.

#### Color transformation module

This module which is part of the display s/w driver converts the file from RGB color coordinates (or CMYK in case of a graphic arts file) to the color coordinates of the display . In the special but important case of 7 color display with the primary colors are red , green , blue , cyan , magenta , yellow and white . The transformation is based on Neugebauer equation and their improvements (see reference page 407) . This module replace the existing color management module in the operating system for screen display (ColorSync in apple computers Mac OS operating system and ICM in Microsoft windows operating system) . An alternative solution will be to have the display color transformation module on the video board. This allows performing some of the calculation in h/w reducing the time needed to make the transformation. This also makes the structure of the new display transparent to the host computer.

#### Display module

In the heart of the display module sits the projection engine . This projection engine receives the data for the different colors and project the light

accordingly . The projection engine can be designed in many different ways. The two major options are:

1.Having a separate spatial light modulator for each color (typical RGB device employing this principal is EPSON EMP-500 multimedia projector) implementing the same concept to 7 color is straightforward extension on the same design principals. This method is not optimal for the design of a 7 color display due to high part count and complex and sensitive optical alignment.

2. Using one special light modulator and be sequentially illuminating it with the primary colors and displaying in synchronization the monochrome image corresponding to the specific primary color ( a typical RGB device employing this principal is DP X16 by DAVIS , Norway ) . This configuration shown in Fig 1. is the preferred embodiment for the 7 color display device, it enjoys low part count and simpler optical alignment (see fig 1).

Combinations of the above methods (several SLM's each projects more then one primary color) are also possible and are being used in some RGB projection devices.

The light emitted from the projection engine can be projected on a screen or on opal glass for rear or front viewing.

Claim:

1. A video display device employing more then 3 primary colors to create color images.

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Patent and Tra

PTO/SB/09 (12-97)  
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In unless it displays a valid OMB control number**STATEMENT CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) & 1.27(b))—INDEPENDENT INVENTOR**Docket Number (Optional)  
1179Applicant, Patentee, or Identifier: BEN-DAVID, ILAN

Application or Patent No.: \_\_\_\_\_

Filed or Issued: \_\_\_\_\_

Title: A HIGH GAMUT VIDEO DISPLAY

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- the specification filed herewith with title as listed above.
- the application identified above.
- the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- No such person, concern, or organization exists.
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Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

Ilan BEN-DAVID

NAME OF INVENTOR

Ilan

Signature of Inventor

June 5, 2000

Date

NAME OF INVENTOR

Ilan

Signature of Inventor

Date

NAME OF INVENTOR

Ilan

Signature of Inventor

Date

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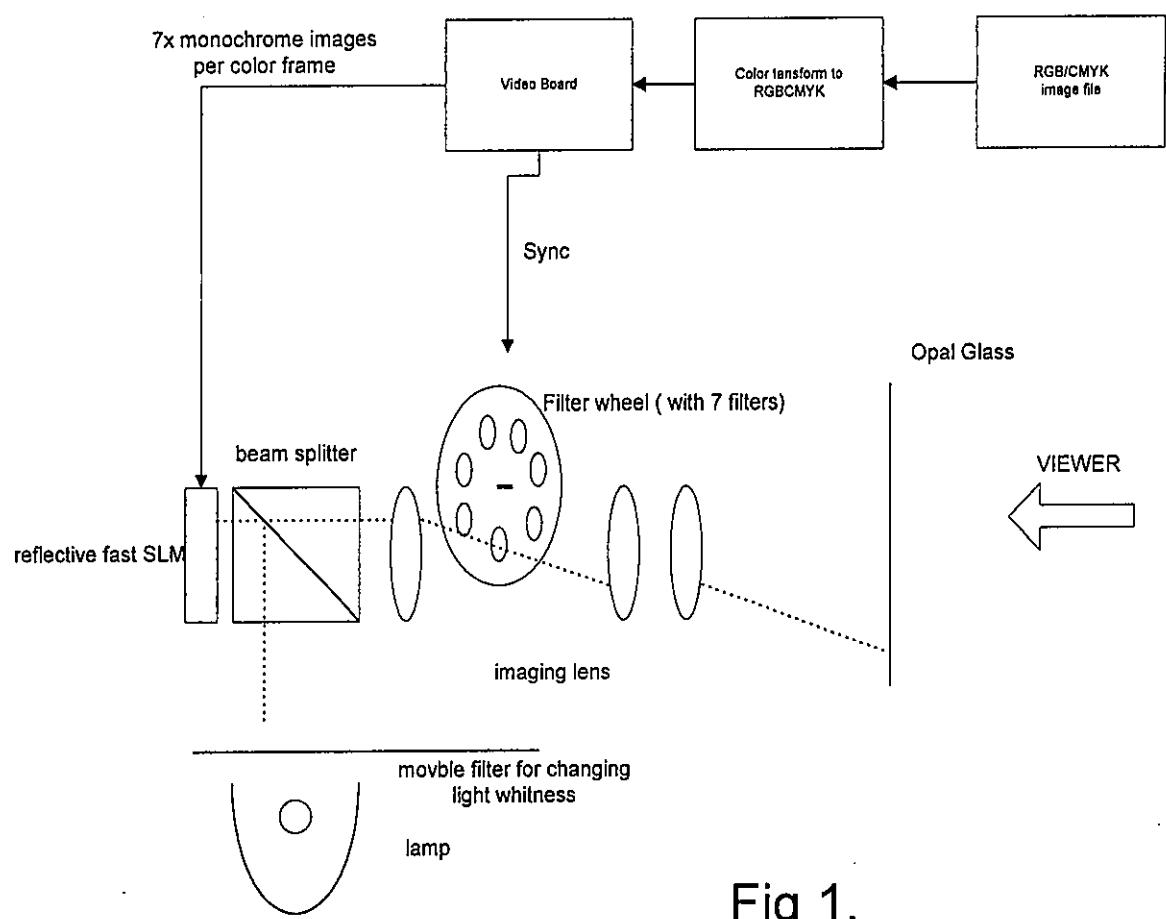
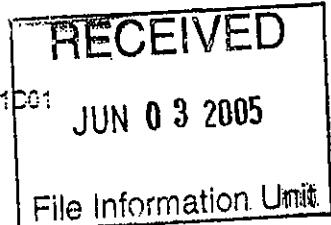


Fig 1.

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In re Application of \_\_\_\_\_

Application Number \_\_\_\_\_

**60/109,771**

Filed \_\_\_\_\_

**Jun, 1, 2000**Paper No. **#2**

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. **2004/0100549** page, \_\_\_\_\_ line \_\_\_\_\_.

United States Patent Number \_\_\_\_\_, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_.

**Related Information about Access to Pending Applications (37 CFR 1.14):**

Direct access to pending applications is not available to the public but copies may be available and may be purchased from the Office of Public Records upon payment of the appropriate fee (37 CFR 1.19(b)), as follows:

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G. Leemar

Signature

SHAHAB GHAYOUR

Typed or printed name

Registration Number, if applicable

1031521-1010

Telephone Number

06-03-2005

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Application Number

10-209771

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Paper No. 3

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United States Patent Application Publication No. \_\_\_\_\_, page, \_\_\_\_\_ line \_\_\_\_\_

United States Patent Number 6870523, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_.

**Related Information about Access to Pending Applications (37 CFR 1.14):**

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Darlene Jones

Signature

Darlene Jones

Typed or printed name

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Image Application of

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60/209771

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Paper No. #4

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is not within the file jacket of a pending Continued Prosecution Application (CPA) (37 CFR 1.53(d)) and which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. \_\_\_\_\_, page, \_\_\_\_\_ line \_\_\_\_\_,

United States Patent Number 6870523, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_.

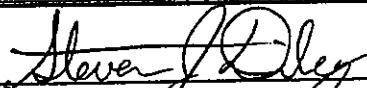
**Related Information About Access to Applications Maintained in the Image File Wrapper System (IFW) and Access to Pending Applications in General**

A member of the public, acting without a power to inspect, cannot order applications maintained in the IFW system through the FIU. If the member of the public is entitled to a copy of the application file, then the file is made available through the Public Patent Application Information Retrieval system (Public PAIR) on the USPTO internet web site ([www.uspto.gov](http://www.uspto.gov)). Terminals that allow access to Public PAIR are available in the Public Search Room. The member of the public may also be entitled to obtain a copy of all or part of the application file upon payment of the appropriate fee. Such copies must be purchased through the Office of Public Records upon payment of the appropriate fee (37 CFR 1.19(b)).

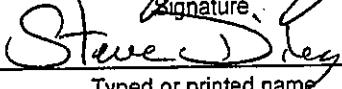
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- (2) If the application is incorporated by reference or otherwise identified in a U.S. patent, a statutory invention registration, a U.S. patent application publication, or an international patent application publication in accordance with PCT Article 21(2), a member of the public may obtain a copy of the pending application as originally filed.



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In re Application of

Application Number

60/209 771

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Paper No. 5

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is not within the file jacket of a pending Continued Prosecution Application (CPA) (37 CFR 1.53(d)), and which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment).

United States Patent Application Publication No. \_\_\_\_\_, page, \_\_\_\_\_ line OCT 15 2007

United States Patent Number 6870523, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_

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(12) **United States Patent**  
Ben-David et al.

(10) Patent No.: US 6,870,523 B1  
(45) Date of Patent: Mar. 22, 2005

(54) DEVICE, SYSTEM AND METHOD FOR ELECTRONIC TRUE COLOR DISPLAY

(75) Inventors: Ilan Ben-David, Rosh Hayin (IL); Moshe Ben-Chorin, Rehovot (IL)

(73) Assignee: Genoa Color Technologies, Herzliya (IL)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/710,895

(22) Filed: Nov. 14, 2000

Related U.S. Application Data

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(51) Int. Cl.<sup>7</sup> ..... G09G 3/34

(52) U.S. Cl. ..... 345/84; 345/32; 348/743;  
348/744

(58) Field of Search ..... 345/84, 85, 691,  
345/697, 32; 349/5, 106, 108; 348/743,  
544

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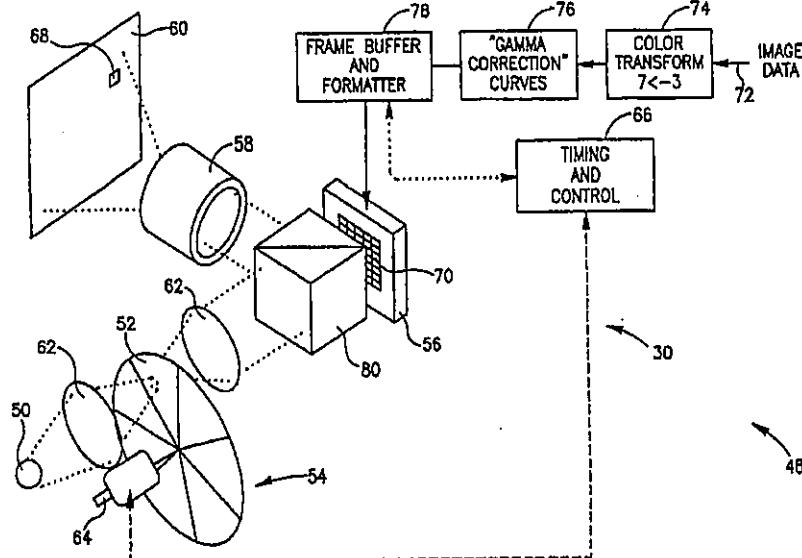
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(57) ABSTRACT

A device, system and a method for displaying an expanded spectrum of colors. The present invention is suitable for various types of electronic display devices, such as televisions and monitor devices ("monitors") for computational devices, for example. The present invention operates by electronic production of more than three primary colors. As previously described, the term "primary color" specifically does not include light as produced by a neutral filter. Thus, unlike background art systems and devices, the present invention is not limited to combinations of colors which are produced from only three primary colors, such as red, green and blue for example.

24 Claims, 10 Drawing Sheets



POSITION	INITIALS	ID NO.	DATE
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## PATENT APPLICATION



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